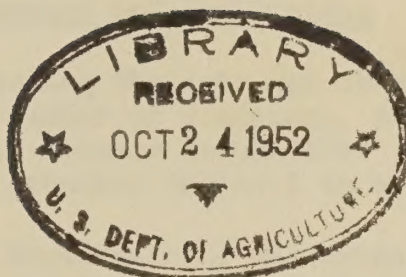


30 POWER REQUIREMENT STUDY,  
THE PIONEER COOPERATIVE ASSOCIATION, INC.,  
(KANSAS 44 GRANT)  
4 (Revised)



2 U.S. Prepared by  
Program Analyst  
Office of the Administrator  
RURAL ELECTRIFICATION ADMINISTRATION //

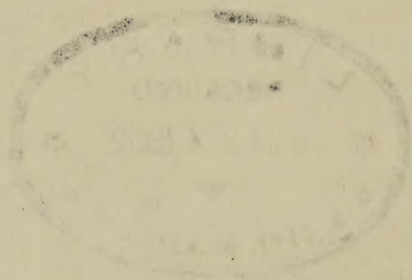
June 1952  
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Chicago, Illinois 60637

June 1982



## POWER REQUIREMENT STUDY 1/

KANSAS 44 GRANT

(Revised)

Foreword

This study has been prepared by the Rural Electrification Administration for use in determining the present and estimated future power requirements of The Pioneer Cooperative Association, Inc. (Kansas 44 Grant).

The estimates of future loads contained in the study have been arrived at from a field survey in the Cooperative's area and from basic data obtained in the Cooperative's office. The estimates of kwh consumption for farm, nonfarm and town residential consumers used herein are based upon a projection of historical trends in consumption, type of farm, income, competitive sources of energy, and other economic factors which are believed to have a bearing on the future use of electricity in this area.

The estimates of average unit kilowatt demands per consumer at peak load, corresponding to the estimated average kilowatt-hour consumption per member per month of farm, nonfarm and small commercial consumers, have been derived from the curve "Maximum Demand at Substation" accompanying Engineering Memorandum No. 94R5 of the Engineering Division, REA, dated August 21, 1950. The total number of consumers to be served in each substation area, rather than the number of consumers in a particular class, was used as a basis in arriving at the total and unit demands in order to reflect the probable overall diversity between classes of consumers in a given substation area. No adjustment for a power factor less than unity was applied, it being assumed for estimating purposes that the KVA demand as read from the curve was equal to the KW demand at the substation.

Summary and Conclusions

Pertinent information reflecting the data and conclusions arrived at regarding the present and future number of consumers, kilowatt-hour requirements, and kilowatt demands for The Pioneer Cooperative Association, Inc. (Kansas 44 Grant) are included in the attached Tables I to VI, inclusive.

Table VI (Summary of Power Requirements) indicates that approximately 2,882 consumers will be served by the Cooperative in 1954, 2,930 in 1957, and 3,088 in 1962, at an estimated maximum demand at substation of 3,076 kilowatts in 1954, 3,473 kilowatts in 1957, and 4,007 kilowatts in 1962. Likewise, it is estimated that the Cooperative's annual energy requirements at substations will approximate 12.1 million kilowatt-hours in 1954, 13.8 million kilowatt-hours in 1957, and 16.1 million kilowatt-hours in 1962.

1/ Based on office revision conducted by K. O. Peters, Engineer, Office of the Administrator, REA, USDA.





The degree of attainment of area coverage by the Cooperative, as well as the achievement of the estimated kilowatt-hour consumption foreseen in this report, are contingent on the following important considerations:

1. An adequate, dependable source of low-cost power supply.
2. Dependable, adequate electrical power to the ultimate consumer with a minimum of interruption in service and at the lowest retail rate commensurate with "pay out" considerations.
3. A fully prosecuted power use program designed to attain the goals of saturation of appliances and farm equipment reflected by the estimates included in this report.

E. C. Weitzell,  
Program Analyst





TABLE I

COMPARATIVE ANNUAL OPERATING DATA ON CONSUMERS  
AND AVERAGE MONTHLY CONSUMPTION

KANSAS 44 GRANT (REV.) (CONT'D.)

YEAR	FARM			TOWN RESIDENTIAL			SMALL COMMERCIAL		
	MEMBERS	AVERAGE		MEMBERS	AVERAGE		MEMBERS	AVERAGE	
	NO.	KWH/MO.	% INCR.	NO.	KWH/MO.	% INCR.	NO.	KWH/MO.	% INCR.
1946	7	315	--	415	65	--	195	133	--
1947	73	129	--	498	79	21.5	259	212	59.4
1948	149	163	26.4	618	98	24.1	283	310	46.2
1949	404	150	-8.0	670	107	9.2	303	330	6.5
1950	910	166	10.7	762	107	-0-	365	322	-2.4
1951	1,308	197	18.7	878	108	0.9	418	372	15.5
1952 *	1,362	226	--	887	122	--	418	399	--
SUM OF YEARLY % INCR.									
(1946 - 1951)			47.8				55.7	125.2	
AVERAGE PER YEAR			12.0				11.1	25.0	

\* FOUR MONTHS ONLY.

(CONT'D. ON NEXT PAGE)

PROGRAM ANALYST, OFFICE OF THE  
ADMINISTRATOR, REA - JUNE 1952

TABLE 1

COMPARATIVE ANNUAL OPERATIVE DATA ON CONSUMERS  
AND AVERAGE MONTHLY CONSUMPTION

YEAR	TOTAL RESIDENTIAL		SMALL COMMERCIAL		TOTAL	
	MEMBERS		MEMBERS		MEMBERS	
	NO.	KWH/NO. & INCH.	NO.	KWH/NO. & INCH.	NO.	KWH/NO. & INCH.
1946	5	412	--	--	62	418
1947	73	129	--	--	79	408
1948	147	103	285	24.1	88	418
1949	404	120	303	30.3	127	470
1950	910	106	362	36.2	167	765
1951	1,708	127	418	41.8	198	878
1952 *	1,965	206	418	41.8	182	887
SUM OF YEARLY CONSUMPTION						
1946 - 1951		47.8	1952		22.1	157.2
AVERAGE PER YEAR		10.10	AVERAGE PER YEAR		11.1	22.0

\* FOUR MONTHS ONLY

ADMINISTRATOR, REA - JUNE 1952  
PROGRAM ANALYST, OFFICE OF THE

(CONT. ON NEXT PAGE)



### COMPARATIVE ANNUAL OPERATING DATA ON CONSUMERS AND AVERAGE MONTHLY CONSUMPTION

\* **FOUR MONTHS ONLY.**

PROGRAM ANALYST, OFFICE OF THE  
ADMINISTRATOR, REA - JUNE 1952





TABLE II

## COMPARATIVE ANNUAL OPERATING DATA ON ENERGY REQUIREMENTS

KANSAS 44 GRANT (REV.)												
YEAR	ENERGY PURCHASED		ENERGY SOLD		ENERGY LOSSES		MAXIMUM KW DEMAND	AVERAGE COST PER KWH	TOTAL MILES ENERGIZED	TOTAL SERVICES CONNECTED	OVERALL CONSUMER DENSITY	
	KWH	% INCR.	KWH	% INCR.	KWH	\$ LOSS						
1944 *	127,600	--	93,310	--	34,290	26.9	--	\$ .0235	49	426	8.69	
1945	656,610	--	623,876	--	32,734	5.0	--	.0282	67	536	8.00	
1946	1,032,773	57.3	940,372	50.7	92,401	8.9	300	.0273	75	651	8.68	
1947	1,521,953	47.4	1,192,417	26.8	329,536	21.7	456	.0259	134	842	6.28	
1948	2,418,913	58.9	2,016,168	69.1	402,745	16.6	700	.0193	251	1,072	4.27	
1949	4,166,657	72.3	3,280,192	62.7	886,465	41.9	1,125	.0089	797	1,688	2.12	
1950	6,384,964	53.2	5,154,366	57.1	1,230,598	19.3	2,000	.0083	1,514	2,514	1.66	
1951	8,963,020	40.4	7,405,713	43.7	1,557,307	17.4	2,562	.0071	1,733	2,709	1.56	
1952 **	3,400,680	--	2,843,955	--	556,725	16.4	2,300	.0061	1,745	2,722	1.56	
SUM OF YEARLY % INCR.												
(1944 - 1951)		329.5										
AVERAGE PER YEAR		54.9										
											</	





TABLE III

## ESTIMATE OF LOADS - ULYSSES SUBSTATION AREA

TYPE OF CONSUMER	NUMBER OF CONSUMERS			KW DEMAND			ANNUAL KWH REQUIREMENTS		
	1954	1957	1962	1954	1957	1962	1954	1957	1962
FARM	890	900	925	@0.869	@0.990	@1.093	@3000	@3480	@3900
TOWN RESIDENTIAL	769	777	837	@0.526	@0.587	@0.705	@1620	@1860	@2340
SMALL COMMERCIAL	298	304	314	@1.468	@1.621	@1.849	@5400	@6000	@6900
PUBLIC BUILDINGS	80	80	80	@0.722	@0.722	@0.722	@2400	@2400	@2400
LARGE COMMERCIAL	32	35	38	@25/2.0DF	@25/2.0DF	@25/2.0DF	@15,000	@15,000	@15,000
IRRIGATION	11	11	11	*	*	*	@22,000	@22,000	@22,000
STREET LIGHTING	2	2	2	@10/1.1DF	@10/1.1DF	@10/1.1DF	@26,400	@27,600	@30,000
KP & L COMP. STA.							52,800	55,200	60,000
CAPITAL DEHYDRATION	1	1	1	@225/1.2DF	@250/1.2DF	@250/1.2DF	1,000,000	1,200,000	1,200,000
PRODUCTS CO. (ALFALFA)	1	1	1	@80/1.2DF	@80/1.2DF	@80/1.2DF	275,000	275,000	275,000
SUB-TOTAL									
PLUS DIST. LOSSES (APPROX.)							7,766,780	8,890,420	10,271,680
TOTAL	2,084	2,111	2,209	2,345	2,629	3,008	9,358,000	10,584,000	12,228,000

\* DOES NOT OPERATE AT TIME SYSTEM PEAK OCCURS.

ANNUAL LOAD FACTOR -

45.6%

46.0%

46.4%

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TABLE IV

## ESTIMATE OF LOADS - HUGOTON SUBSTATION AREA

KANSAS 44 GRANT (REV.)

TYPE OF CONSUMER	NUMBER OF CONSUMERS			KW DEMAND			ANNUAL KWH REQUIREMENTS		
	1954	1957	1962	1954	1957	1962	1954	1957	1962
FARM	541	551	575	@0.881	@1.003	@1.107	@3000	@3480	@3900
NONFARM (RES.)	194	202	233	@0.533	@0.595	@0.714	@1,623,000	1,917,480	2,242,500
SMALL COMMERCIAL	24	26	30	@1.488	@1.643	@1.874	@1620	@1860	@2340
PUBLIC BUILDINGS	30	30	30	@0.731	@0.731	@0.731	314,280	375,720	545,220
LARGE COMMERCIAL	6	7	8	@25/2.0DF	@25/2.0DF	@25/2.0DF	@5400	@6000	@6900
IRRIGATION	1	1	1	*	*	*	129,600	156,000	207,000
STREET LIGHTING	2	2	2	@10/1.1DF	@10/1.1DF	@10/1.1DF	@2400	@2400	@2400
SUB-TOTAL							72,000	72,000	72,000
PLUS DIST. LOSSES (APPROX.)							@15,000	@15,000	@15,000
TOTAL	708	819	879				90,000	105,000	120,000
							@22,000	@22,000	@22,000
							22,000	22,000	22,000
							@26,400	@27,600	@30,000
							52,800	55,200	60,000
							2,303,680	2,703,400	3,268,720
							@17%	@16%	@16%
							472,320	514,600	622,280
							2,776,000	3,218,000	3,891,000

\* DOES NOT OPERATE AT TIME SYSTEM PEAK OCCURS.

ANNUAL LOAD FACTOR -

43.4%

43.5%

44.5%

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TABLE V

ESTIMATE OF LOADS - SUMMARY OF POWER REQUIREMENTS  
(BY CLASSIFICATION OF CONSUMERS)

KANSAS 44 GRANT (REV.)	NUMBER OF CONSUMERS				KW DEMAND			ANNUAL KW-H REQUIREMENTS		
	TYPE OF CONSUMER				1954			1957		
	1954	1957	1962	1962	1954	1957	1962	1954	1957	1962
FARM	1,431	1,451	1,500	1,500	1,250	1,444	1,648	4,293,000	5,049,480	5,850,000
TOWN RESIDENTIAL	963	979	1,070	1,070	507	576	756	1,560,060	1,820,940	2,503,800
SMALL COMMERCIAL	322	330	344	344	473	536	637	1,738,800	1,980,000	2,373,600
PUBLIC BUILDINGS	110	110	110	110	80	80	80	264,000	264,000	264,000
LARGE COMMERCIAL	38	42	46	46	475	526	575	570,000	630,000	690,000
PUBLIC STREET & HWY.	4	4	4	4	36	36	36	105,600	110,400	120,000
IRRIGATION	12	12	12	12	*	*	*	264,000	264,000	264,000
KP & L GAS COMP. STA.	1	1	1	1	188	208	208	1,000,000	1,200,000	1,200,000
CAPITAL DEHYDRATION PRODUCTS CO. (ALFALFA)	1	1	1	1	67	67	67	275,000	275,000	275,000
SUB-TOTAL								10,070,460	11,593,820	13,540,400
PLUS DIST. LOSSES (APPROX.)								2,063,540	2,208,180	2,578,600
TOTAL	2,882	2,930	3,088	3,088	3,076	3,473	4,007	12,134,000	13,802,000	16,119,000

\* NOT INCLUDED. SYSTEM PEAK OCCURS IN WINTER.

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TABLE VI

ESTIMATE OF LOADS - SUMMARY OF POWER REQUIREMENTS  
(BY SUBSTATION)

KANSAS 44 GRANT (REV.)

SUBSTATION AREAS	NUMBER OF CONSUMERS			KW DEMAND			ANNUAL KWH REQUIREMENTS		
	1954	1957	1962	1954	1957	1962	1954	1957	1962
ULYGSES	2,084	2,111	2,209	2,345	2,629	3,008	9,358,000	10,584,000	12,228,000
HUGOTON	798	819	879	731	844	999	2,776,000	3,218,000	3,891,000
TOTAL	2,882	2,930	3,088	3,076	3,473	4,007	12,134,000	13,802,000	16,119,000

ANNUAL LOAD FACTOR - 45.0% 45.4% 45.9%

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